

*Sameeksha** – Antimicrobial Resistance (AMR)

Key highlights

- Quadripartite's campaign guide for WAAW 2023
- UNICEF's technical note identifies AMR/drug-resistant infections as urgent threat
- WHO guidelines for developing a national genomic surveillance strategy or action plan
- Online gaming as an educational resource for AMR
- Monitoring of AMR in the environment – importance and implementation
- Diagnostic stewardship care-bundle to optimise reporting of blood cultures
- Clovibactin, a new antibiotic, shows promise in animal studies

Strategic priority 1: Awareness and understanding

World AMR Awareness Week 2023 – campaign guide

- Provides key information and ideas on how you can join and participate in the WAAW celebrations.
- Includes the campaign theme, calls to action, how to participate, social media information and links to various campaign resources.

FAO-UNEP-WHO-WOAH | Manual | 11 August 2023 | [Online link](#)

AMR: The urgent threat of drug-resistant infections

- This technical note reflects UNICEF's response to the growing global threat of AMR to child survival, growth and development.
- Identifies AMR-specific and AMR-sensitive actions in reducing infections, promoting access to and optimal use of antimicrobials, and increasing awareness and understanding.

UNICEF | Guidance note | 14 August 2023 | [Online link](#)

Physicians' antibiotics prescribing patterns for common diseases and knowledge on antimicrobial resistance: a descriptive cross-sectional study

- Mixed methods survey of patients and carers in Bangladesh shows that 66% patients go to traditional healers and pharmacy; and 65.8% caregivers do not have knowledge about antimicrobial resistance.
- Most respondents demonstrated poor knowledge of AMR which highlights need for community-based awareness program to create awareness on AMR and negative effects of overuse of antibiotics.

Asia Pacific Journal of Health Management | Scientific article | 12 August 2023 | [Online link](#)

A brief review of online education resources on gamification in addressing antimicrobial resistance

- Assesses accessibility, usability, playability and learning outcomes of two games (Terebra and Micro-Combat) in promoting awareness and action on AMR.
- They were found to be good pilots for using games in AMR education but suggested using real life AMR context in low and middle-income countries in future games.

JAC-Antimicrobial Resistance | Review article | 8 August 2023 | [Online link](#)

Knowledge, attitude, and practice of antibiotic use and resistance among poultry farmers in Nepal

- Cross-sectional survey reports good knowledge of and attitude towards antibiotic use but poor practices among poultry farmers, especially older farmers and those raising backyard poultry.
- Recommends regulation of over-the-counter sale of antibiotics, prescription based usage and adoption of a One Health approach to AMR policies and interventions.

Antibiotics | Scientific article | 25 August 2023 | [Online link](#)

#AMRounds: a systematic educational approach for navigating bench to bedside antimicrobial resistance

- Presents a standardised framework to systematically approach clinical AMR, promote awareness and optimize treatment decisions.
- This educational tool aims to promote AMR education in clinical settings by integrating concepts from infectious diseases, clinical microbiology and pharmacology.

JAC-Antimicrobial Resistance | Review article | 14 August 2023 | [Online link](#)

The burden of antimicrobial resistance in the Americas in 2019: a cross-country systematic analysis

- Estimates AMR deaths and disability-adjusted life-years (DALYs) attributable to and associated with AMR.
- Reports 569,000 deaths associated with bacterial AMR among the 35 countries in the WHO Region of the Americas in 2019, with lower respiratory and thorax infections accounting for the largest fatal burden of AMR.

The Lancet Regional Health – Americas | Scientific article | 8 August 2023 | [Online link](#)

Strategic priority 2: Laboratories and surveillance

Considerations for developing a national genomic surveillance strategy or action plan for pathogens with pandemic and epidemic potential

- Provides a stepwise approach to develop an adequately resourced genomic surveillance plan for existing and novel pathogens.
- Targets the stakeholders at national and subnational levels including health authorities, One Health partners, researchers, private sector and laboratory specialists.

WHO | Technical document | 18 August 2023 | [Online link](#)

Towards monitoring of antimicrobial resistance in the environment: For what reasons, how to implement it, and what are the data needs?

- Comprehensive review of the importance of environmental AMR surveillance, which identifies existing knowledge gaps.
- Highlights the need to establish background levels of environmental AMR, definition of high-risk environments for transmission and appropriate detection methods - prevent a systematic environmental monitoring of AMR.

Environment International | Review article | 11 July 2023 | [Online link](#)

Population structure and antimicrobial resistance patterns of *Salmonella* Typhi and Paratyphi A amid a phased municipal vaccination campaign in Navi Mumbai, India

- Whole genome sequencing of typhoidal *Salmonella* isolates collected via prospective surveillance finds transmission of different genotypes, with strong evidence of spatial genetic clustering.
- Highlights need to complement vaccination with local WASH initiatives to control enteric fever in India.

mBio | Research article | 28 July 2023 | [Online link](#)

Prevalence of vancomycin-resistant *Enterococci* in India between 2000 and 2022: a systematic review and meta-analysis

- Estimates pooled prevalence of vancomycin-resistant *Enterococci* (VRE) to be 12.4% with *E. faecium* (58.2%) being the most prevalent VRE, followed by *E. faecalis* (36.4%).
- An increasing trend over time suggests the need for stricter IPC measures, national AMS program and limiting antimicrobial use in animal husbandry.

Antimicrobial Resistance & Infection Control | Review article | 21 August 2023 | [Online link](#)

Contribution of wastewater to antimicrobial resistance: a review article

- Reviews monitoring of wastewater from agriculture, pharmaceuticals and hospitals as key promoters of AMR.
- Monitoring and controlling AMR in wastewater requires additional data and refined technologies.

Journal of Global Antimicrobial Resistance | Review article | September 2023 | [Online link](#)

Advancing sewage surveillance at mass gathering events for reducing transmission of antimicrobial resistant bacterial pathogens

- Explores the role of wastewater monitoring at mass gatherings enabling health authorities to identify hotspots of transmission and implement targeted public health interventions.
- Recommends establishing effective global longitudinal and cross-sectional wastewater AMR surveillance collaborations to study the emergence, transmission and surveillance of AMR and ARGs.

Travel Medicine and Infectious Disease | Commentary | 27 July 2023 | [Online link](#)

Strategic priority 3: Infection prevention and control

Sameeksha – Infection Prevention and Control | volume 3

- Risk factors associated with surgical site infections
- IPC for TB should be framed as a health systems issue
- High certainty evidence for negative pressure wound therapy to avoid SSIs
- Potential options for catheter coatings to reduce catheter-associated urinary tract infection

WCO India | Publication | 7 September 2023 | [Online link](#)

Strategic priority 4: Optimise use of antimicrobials

A prospective study evaluating the effect of a 'diagnostic stewardship care-bundle' for automated blood culture diagnostics

- Assesses the effectiveness of diagnostic stewardship care-bundle checklist for sepsis (Sepsis-48 DSB) in reducing turn-around-time (TAT) in patients with gram negative infections by 694 minutes.
- Provisional blood culture reports along with direct microbial identification were issued by directly inoculating conventional biochemical tests and direct antimicrobial susceptibility testing using EUCAST rapid AST method.

Journal of Global Antimicrobial Resistance | Scientific article | 26 July 2023 | [Online link](#)

The effect of a comprehensive typhoid conjugate vaccine campaign on antimicrobial prescribing in children in Harare, Zimbabwe: a mixed methods study

- Mass vaccination campaign (with Typbar-TCV) reduced typhoid fever cases among children but a reduction in antibiotic prescriptions was not seen.
- Recommends integration of vaccines with health system strengthening WASH and access to diagnostics to reduce antimicrobial use.

The Lancet Global Health | Scientific article | September 2023 | [Online link](#)

Antimicrobial stewardship program: fighting antimicrobial resistance in India

- Defines AMS and the importance of developing and implementing a multidisciplinary approach.
- Identifies key challenges and future recommendations for an effective AMS program in India.

National Journal of Physiology, Pharmacy and Pharmacology | Review article | 3 September 2023 | [Online link](#)

Strategic priority 5: Research, innovations, and finance

An antibiotic from an uncultured bacterium binds to an immutable target

- Reports a new antibiotic (Clovibactin) isolated from soil bacteria – effective in an animal model of *S. aureus* infection.
- Clovibactin shows promise of enabling the design of better drugs that kill bacteria without resistance.

Cell | Scientific article | 22 August 2023 | [Online link](#)

Anti-quorum sensing potential of selenium nanoparticles against LasI/R, RhII/R, and PQS/MvfR in *Pseudomonas aeruginosa*: a molecular docking approach

- Demonstrates that selenium nanoparticles have anti-quorum sensing properties against *P. aeruginosa*.
- Selenium nanoparticles may be a novel alternative to conventional antibiotics but needs clinical studies.

Frontiers in Molecular Biosciences | Scientific article | 10 August 2023 | [Online link](#)

Revisiting ESKAPE pathogens: virulence, resistance, and combating strategies focusing on quorum sensing

- Uses the analogy of basketball to review complex biological mechanisms around ESKAPE pathogens.
- Recommends combining quorum sensing inhibitors with antibiotics; and identifies key research topics to better understand the relationship between quorum sensing signals, pathogens and health.

Frontiers in Cellular and Infection Microbiology | Review article | 29 June 2023 | [Online link](#)

Whole genome sequencing and pan-genomic analysis of multidrug-resistant *Vibrio cholerae* VC01 isolated from a clinical sample

- Whole genome sequencing done in a multi-drug resistance isolate of *Vibrio cholerae* isolated from a patient in Silvasa.
- Underscores the need to pursue novel approaches, such as vaccines to address multi-drug resistant cholera.

Microorganisms | Scientific article | 7 August 2023 | [Online link](#)

Associations between nutrigenomic effects and incidences of microbial resistance against novel antibiotics

- Reviews evidence on the effects of nutrients on genomes and epigenomes which may perpetuate AMR.
- Recommends that AMS programs integrate nutrigenomic approaches.

Pharmaceuticals | Review article | 1 August 2023 | [Online link](#)

Exploring the views of infection consultants in England on a novel delinked funding model for antimicrobials: the SMASH study

- Cross-sectional survey assesses subscription models for antibiotics in hospitals (SMASH) that delinks price paid for an antimicrobial from the volume sold, with potential impact on prescription practices and patient care.

JAC-Antimicrobial Resistance | Scientific article | 1 August 2023 | [Online link](#)

Is scientific evidence enough? Using expert opinion to fill gaps in data in antimicrobial resistance research

- Aims to identify quantifiable data on drivers of AMR through a participatory modelling workshop.
- Provides knowledge basis that may help inform future AMR emergence and transmission.

PLoS One | Scientific article | 24 August 2023 | [Online link](#)

Strategic priority 6: Collaborations

Global strategies to combat antimicrobial resistance: a One Health perspective

- Narrative review of the key global strategies to monitor and help reduce burden of AMR across sectors with a collaborative, multi-faceted One Health approach.
- Recommends sustainable AMS programs to optimise the use of antimicrobials and reduce AMR.

Pharmacology & Pharmacy | Review article | 23 August 2023 | [Online link](#)

Quotable quote

“We recognize that it is imperative that national governments accord utmost priority to this hitherto neglected problem to preserve efficacy of the antimicrobial agents – in our fight against microbial diseases”

– Jaipur Declaration on AMR signed on 6 September 2011
by the Health Ministers of Member States of the WHO South-East Asia Region

**Sameeksha* is a Hindi word, meaning review. This compilation of publications and resources (along with a brief summary) aims to review and share information to facilitate containment of antimicrobial resistance in India, grouped according to the strategic priorities of India's National Action Plan on Antimicrobial Resistance. Kindly note, inclusion of publications and resources in this review/compilation does not imply an endorsement by WHO.